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AUTHOR Almanza, Tina
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ABSTRACT

A study examined a comparison of the effectiveness of cooperative learning in small groups with whole classroom instruction using the Directed Reading Thinking Activity (DRTA) during reading. Subjects for the 8-week study were 53 sixth-graders from 2 classes in Brooklyn, New York. The stories used all came from the same basal reader. A reading comprehension test was given each child after each story was completed. Children in cooperative learning groups read stories on their own and wrote any questions or comments in their reading log. The next day, each group met to discuss the story. Students worked in groups for approximately 4 weeks. For the next 4 weeks, the students continued to read, using the DRTA strategy, and when the story was completed the children read and answered questions about the story independently. A reading comprehension test was again given after the completion of each story. Results indicated that the majority of children in the cooperative reading groups scored higher on their reading comprehension tests than when they used the DRTA. Findings suggest that cooperative learning can be used as an instructional strategy whereby students can improve their reading comprehension. (Contains 2 tables of data; related research, 17 references, and cooperative learning scores are appended.) (CR)

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ED 405 565

The Effects of the D.R.T.A. and Cooperative Learning Strategies on Reading Comprehension

by

Tina Almanza

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Abstract

An eight week study was conducted comparing the effectiveness of cooperative learning in small groups with whole classroom instruction using the Directed Reading Thinking Activity during reading. Fifty-three sixth grade children from two classes were included in this study. The stories used in this study came from the same basal reader. A reading comprehension test was given to each child after each story was completed.

Children in the cooperative learning groups read their stories on their own. They wrote any questions or comments in their reading log. The next day, each group met to discuss the story and then continued to answer, as a group, comprehension questions regarding the story that was read. The students worked in their groups for approximately four weeks.

The children continued to read using the Directed Reading Thinking Activity strategy. When the story was completed, the children read and answered questions about the story independently. Again, a reading comprehension test was given after the completion of each story. The scores from the cooperative learning group and the Directed Reading Thinking Activity strategy were then compared. The results of this study attest to the fact that when the children were in the cooperative learning groups, the majority of them scored higher on their reading comprehension tests than when they used the Directed Reading Thinking Activity.

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Dedication

This paper is dedicated to my husband, Larry Almanza. Without his love and support I would have never achieved my goals. Thank-you for believing in my ability to complete this program and for seeing my potential before I did.

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When dealing with nonmotivated, sixth graders, does cooperative learning enhance reading comprehension more so that the Directed Reading Thinking Activity?

Alliteracy, the ability to read but the unwillingness to do so, is a growing problem among young people. Educators need to look into different methods in order to get children interested in fictional and non-fictional stories.

Motivation is one problem that deals with adolescent children. Surprisingly, the lack of motivation to read is not limited to only poor readers, both good and poor readers are reluctant to engage in recreational and independent reading.

One major problem occurs when students who are quite able readers chose not to read selections of content area texts assigned by the teacher.

Another concern of teachers is that many students take reading for granted. Learning to read is one the most important thing children accomplish in elementary school because it is the foundation for most of their future academic endeavors. From the middle elementary years through the rest of a their lives as students, children spend much of their time reading and learning

information presented in text. (Stevens, Slavin, & Farnish).

How can a child improve his reading comprehension if one does not read? What ever the reading strategy is, a child must read in order to improve his or her reading comprehension.

Affect and motivation play a significant, if not paramount role in content area reading . Reading to learn requires that a reader begins by engaging the text- opening the book and starting to read it and continues by interacting with the text comprehending, interpreting, and assimilating the author's ideas within the framework of the readers' prior knowledge and experience (Frager, 1993).

Teaching adolescent children is not an easy task. Boys and girls between the ages of ten and fourteen are experiencing profound changes- physically, emotionally, socially and intellectually as they pass through very critical periods of their lives. Also, the success of students in middle level grades is often the forerunner of success in high school.

Educators and psychologists are seeking alternatives to the traditional. One group classroom which stresses individual comparison and competition (Sharan, & Ackerman,1992).

Directed Thinking Reading Activity is a strategy which helps comprehension. Studies have found that teachers spend less time in using practices that teach reading comprehension. Rather they spend most of their reading instruction time assessing children, assigning skills base worksheets concerned with decoding and reading skills at the word and sentence levels (Mason, 1983).

One problem on why cooperative learning is not as popular as the D.R.T.A., is that teachers tend to teach the way they were taught. Through 12 years of school and 4 years of college our students learn about teaching by observing those who teach them the content of their courses. It's little wonder that our reading methods course do not take; even when we are modeling the best behaviors and strategies fore our preservice teachers. There is too much old learning to be unlearned before the new learning can be assimilated (Searl, 1991).

Teachers must overcome their apprehension about teaching other reading comprehension strategies in order to help motivate students to read. Teachers want students to compare ideas, develop a train of thought, air differences, or arrive at a consensus on controversial issue, then the forum of small groups may be use the right setting for most students to carry on

intensive conversation and discussion, especially for student too shy to say much in the larger setting of the whole class (Nystrand, Gam, Oran & Heck, 1993).

Hypothesis:

To add information on its relative effects of cooperative learning and the DRTA, the following study was undertaking. It was hypothesized that cooperative learning, when implemented in a regular sixth grade classroom is more effective in improving reading comprehension than the Directed Reading Thinking Activity.

Procedure:

The research was conducted in Brooklyn, New York. I.S. 281 is made up of sixth, seventh and eighth graders. The subjects consist of fifty-three sixth grade students. These students were heterogeneously mixed. They come from low to middle income families and are similar in ethnicity. Approximately fifteen students from the group speak little or no English. Instead of going to foreign language class, these students go to E.S.L. classes (English as a Second Language).

Language Art lessons are conducted during forty-five minute intervals. There was flexibility in the schedule to extend the lesson to ninety minutes if need be. This study was conducted for approximately six weeks.

The stories that were used in this study came from a sixth grade basal reader called The Language of Literature by McDougal Littell. All the stories are on the same reading level. Each sample got stories based on the same themes. With the integration of social studies and language arts, Greek myths were incorporated in both the Directed Reading Thinking Activity and cooperative learning groups. The major theme that the stories have in common was Proving Ground; the reading selections were based on characters which undergo tests that challenge their beliefs and values. The following stories were used in the cooperative learning groups: "Talking With Artists" by Pat Cummings, "The White Umbrella" by Gish Jen, "Damon and Pythias" retold by Fan Kissen.

These stories used with the D.R.T.A. strategies were: "Champions" by Bill Little Field. "Wings" retold by Jane Yolen. "Gold and Silver, Silver and Gold" by Alvin Schwartz.

The questions from each story, supplied by the publisher, were used. Some of these questions that precede each selection tap into students' prior

knowledge and provide background information relevant to the theme. Following each selection, students are asked to give their personal responses to the literature, develop higher- level responses, and finally to connect the selection to their world.

In the cooperative learning group the teacher structured group processing by assigning such tasks as (a) list at least three member actions that helped the group be successful and (b) List one action that could by added to make the group even more successful tomorrow. The teacher will also monitor the groups and give feedback on how well the groups are working together.

The room was arranged in groups of four desks facing each other in order for students to explain, discuss, and teach what they know to classmates. Since groups cannot function effectively if students do not have and use the needed social skills, these skills. Collaborative skills include leadership, decision- making, trust- building, communication and conflict-management skills.

The teacher modeled along with another teacher what a normal conversation between people should be like. The teacher should let the speaker finish his or her remarks and then intervene with comments such as:

excuse me..., I'd like to add..., I disagree..., I agree because..., I don't understand..., What you mean..., I'm confused..., I'd like to expand on that... These phrases were posted on chart paper in view of the groups in order for students to have easy reference for discussion language.

In the cooperative learning group, the teacher gave a prereading discussion about a story. The students then read the story on their own time. If a low ability of E.S.L. student was having difficulty, he or she paired up with a friend in order to read the story together. After each reading assignment the students then wrote in their reading logs. The students wrote any comments or questions to be discussed during the next day's lesson. Then the students, as a group, discussed and answered questions pertaining to the story. Questions from each story included personal response, literal, inferential and critical thinking analysis. Conflict, theme, characterization, cause and effect, are some of the strategies that were covered during the answering of questions. Graphic organizers, such as semantic webs, story maps, and Venn diagrams were used as a springboard prior to answering questions.

After each story was read, a formal assessment test about the story was given to each individual. At the end of the three week cooperative learning

study, another reading test from the Get Set for Reading booklet, level E was given.

During the next three weeks, the researcher taught the D.R.T.A. strategy. Once again the stories came from the Language of Literature basal. For each story the researcher identified purposes for reading. Students set individual purposes for reading by combining prior knowledge with the information from the text to predict what the story will be about. Students then read one or two pages in order to clarify or confirm their prediction. The teacher adjusted the rate and flow of information to the purposes and to the material of the story. She decided the amount text to be revealed between stop points and the length of discussion time for each question asked.

After each story the child answered the questions at the end of the story. The questions are similar to the ones using the cooperative learning groups. All work was done on an individual basis. After each story was read, a formal test was given. Each formal test contained a multiple choice section, vocabulary section, and answering questions based on the child's understanding of the story.

At the end of the D.R.T.A. unit another Get Ready Reading test was administered. The Get Ready Reading Tests from the cooperative learning

groups as well as the D.R.T.A. were then compared to the pretest which was given at the beginning of the story. The formal tests from the cooperative learning groups and the D.R.T.A. were also be compared to determine the significance of mean differences.

Results:

As can be seen in Table I, there was a difference of 4.47 points

Table I

Means, Standard Deviations and t of the
Samples' Pre and Posttests

Sample	M	SD	t
PRETEST	71.06	10.69	1.87
POSTTEST	75.53	12.92	

NS

between the means of samples' achievement when pre and posttest scores were compared, but was statistically not significant , although appropriately significant.

Table II illustrates there was a difference of 5.4 points

Table II

Means, Standard Deviations and t of the Samples' Directed Reading Thinking Activity and Cooperative Learning

Sample	M	SD	t
D.R.T.A.	78.36	9.92	3.26
Cooperative	83.75	6.87	

sig < .01

between the means of the samples' comprehension of the stories used instruction and this difference was statistically significant below the .01 level.

Conclusion

The result of this experiment supported the effectiveness of cooperative learning when dealing with reading comprehension. Cooperative learning can be used as an instructional strategy whereby students can improve on their reading comprehension.

The use of active learning strategies, such as cooperative learning, is growing. Although research demonstrates that cooperative learning produces higher achievement than do competitive or individualistic experiences, some of these effects, however, do not automatically appear when students are placed in groups. To be cooperative, a group must have clear positive interdependence, use their skills as a group to work together and each member must hold each other personally and individually accountable to do his or her fair share of the work.

In conclusion, the results of the present study provide some information that students' achievement in reading comprehension can be improved by using cooperative learning groups.

Cooperative Learning Strategies on Reading Comprehension: Related Research

Social interaction, particularly peer interaction, is a valuable part of classroom learning Vygotsky (1978), in fact, asserts that social interaction is essential for the development of cognition, learning, and knowledge. In the Untied States and abroad, cooperative learning has proved to be one way to promote successful interaction in classrooms. (Johnson&Johnson 1985)

Cooperative learning can easily be implemented in the classroom. The main objective of cooperative learning is to help students understand the values of working together for the purpose of learning. (Saban, 1993). Cooperative learning is not a new strategy. John Dewey (1859-1952) advocated at the end of the 1800's that pupils work in committees to solve problems.

Cooperative learning is one way to get everyone in the classroom involved in the learning process. Evans,Gatewood, & Green (1993) address the following five reasons for such promotion: (a) youngsters at that age have certain developmental characteristics that necessitate their socialization in a group; (b) Cooperative learning is fitting with the middle schools philosophy

that emphasized the inclusion of all students in the building and that favors mixed ability grouping or tracking; (c) the 'cooperation' skill should be taught to children at this critical time in their lives; (d) research suggests the effectiveness of cooperative learning on student achievement

Many educators are familiar with the words cooperative learning, but what is its definition? Saban (1993) refers to cooperative learning as a strategy that puts forward a collaborative effort of heterogeneous groups (commonly two to six students) in pursuing academic goals. Cooperative learning organizes students into various heterogeneous groupings for both learning and social process.

The use of cooperative learning groups not only improve social skills but also cognitive skills. Students must interact with a person who is more expert that themselves (be it an adult or a peer) in order to go beyond their current level of development. Dialogues among students helps them explore, clarify, and internalize concepts that are difficult to learn. Vygotsky (1978).

Before a teacher introduces any cooperative learning strategy to the students, the educator must prepare for the planning and implementation of this strategy. Simply placing students in groups and telling them to work together does not in and of itself produce cooperation. Johnson & Johnson

(1985).Students have to be taught, in the group, how to work together in a productive manner.

Teaching students interpersonal skills is imperative if group work is to be established. For cooperative learning to be effective, learners ought to know, accept, trust and support one another. Students must adopt social skill approaches to listening, positive reinforcement and unanimous decision making.

When it comes to small group approaches, high-ability students who actively taught other students, as often happens in mixed-ability groups, showed excellent performance on the retention test. Low ability students who received coherent explanations, as often occurred in mixed-ability groups, did better on the retention test than low-ability students who did not receive clear explanations (Peterson&Janicki, 1979).

Stuart Yager, David W. Johnson and Roger T. Johnson conducted a study on oral discussion, group to individual transfer and achievement in cooperative learning groups.

The results indicate that students in cooperative groups performed significantly higher on the accuracy of daily work that did student working individualistically. In addition, the high-, medium-, and low ability students in

the structured oral discussion cooperative condition scored higher on the postinstructional and retention tests (which were taken individually) that did the students in the other two conditions, and the students in the unstructured oral discussion cooperative condition scored higher on these tests that did the students who had learned individualistically.

There are three assumptions which are associated in this study. The first assumption is students learning within cooperative learning groups will consecutively perform better than will students who have worked by themselves to learn the same material. The second assumption is that oral explanation, summarizing, and expansion of the material being learned, as well as listening carefully to check the accuracy of others' oral summaries, positively affects achievement and retention. The third assumption is that students learn more when they collaborate with peers of various levels.

In this study, cooperative learning discussions are broken down into two different types. Type 1 is structured oral discussion. In these discussions, students are given specific role assignments. Unstructured oral discussions, students are told only to collaborate without specific role assignments. In an individualistic learning situation, students' goal achievement of one student is unrelated to the goal achievement of others.

Students were together for 36 minutes daily for 18 instructional days. After nine class sessions the students were given a midpoint achievement test. At the end of the 18 day unit, the students were give a final test.

Three measures of achievement were taken. Daily achievement, which includes the accuracy and quantity of the work done in class by the groups and individuals. Unit achievement (two 35 item multiple choice tests). Retention achievement was measured by a 50 item multiple choice test given. The unit tests had an average difficulty of 55 and a reliability of 84 (using Kuder and Richardson;s Formula 21). The retention test had an average of difficulty of 53 and a reliability of 89.

The results of this study show that cooperative groups consistently achieved higher scores than did the students in the individualistic condition on the daily achievement measures. The students in the structured oral discussion cooperation group achieved a 93% accuracy rate on their daily assignments. The students in the unstructured oral discussion cooperation group achieved an 87% accuracy rate. The student in the individualistic condition achieved a 61% accuracy rate.

For the post and retention tests, the children were placed in high, medium, and low ability groups. In the structured cooperation group, the

mean scores for the post achievement measures are 67.75, 65.56 and 66.50 respectively. For the retention tests they were 48.75, 46.78 and 44.75 respectively.

In the unstructured cooperation groups the scores for the post test were 54.13, 51.56 and 50.63. For the retention test the scores were 37.13, 34.56 and 34.10 respectively.

For the individualistic post tests the scores were 43.63, 45.78 and 40.60. For the retention test the scores were 28.51, 24.78 and 19.63 respectively.

This research shows that when children orally explain, summarize and elaborate the material being learned along with listening to others' summaries carefully to check accuracy and to ask questions, to test understanding and encourage elaboration promotes mastery, understanding and retention of the material being learned. (Yager, Johnson, & Johnson, 1985).

These results strongly support the efficiency of cooperative learning and the importance of structured oral interaction within cooperative learning groups.

Two studies were also conducted to evaluate a comprehensive cooperative learning approach to elementary reading and writing instruction.

Robert J. Stevens, Nancy A. Madden, Robert E. Slavin and Anna Marie Farnish found significant effects in favor of the Cooperative Integrated Reading and Composition (CIRC) students on standardized measures of reading comprehension, reading vocabulary, language mechanics, language expression, and spelling.

The form of cooperative learning on which the CIRC program was based on is derived from research and development by Slavin and his colleagues at John Hopkins University (Slavin,1986).

The CIRC program includes 1. Teacher instruction. 2. Team practice. 3. Individual assessments. 4. Team recognition. A major objective of this program was to use the cooperative teams to help students learn broadly applicable reading comprehension skills.

The major components of CIRC are: basal related activities, direct instruction in reading comprehension, and integrated language arts in writing.

In basal related activities, after stories were introduced, students were given a series of follow-up-up activities to work on as a team. In direct instruction in reading comprehension, worksheets or games with other team members to practice the particular skill were given to the students. First teammates would work cooperatively to gain consensus on one set of items;

then they would practice independently on a second set of items, compare answers and discuss discrepancies. Finally, in the integrated language arts and writing part, the teachers used a specific language arts and writing curriculum developed for the project.

Two studies were conducted to see if the Cooperative Integrated Reading and Composition (CIRC) would help 3rd and 4th grades in a heterogenously mixed groups improve their reading comprehension.

In study one, 461 3rd and 4th grade students in 21 classes were chosen for the study. The 11 experimental classes in six schools were matched on California Achievement Test total reading scores with 10 classes in four control schools.

The control teacher taught the classes using a basal series in three reading groups, with workbooks and worksheet activities for follow up time.

The experimental teachers taught the Cooperative Integrated Reading and Composition process. This study took place over a 12 week period of time.

The California Achievement Test scores from the previous year were used as pretest scores. These scores were transformed to z scores separately for each grade in order for the data from both grades could be combined.

The results were as follows: No pretest difference was found on the variable. The class -- level ANOVA's found statistically significant differences favoring the experimental group on four of the five standardized tests. The tests were, reading comprehension, reading vocabulary, language expressions and spelling.

The class - level ANOVA has found statistically significant differences favoring the experimental group on four of the five standardized tests. Reading Comprehension, $F(1, 19 = 4.85, p < .04$, Reading Vocabulary, $F(1, 19) = 4.62, p < .05$, Language Expression, $F(1, 19) = 4.45, p < .05. < .05$, and Spelling, $F(1, 19) = 11.29, p < .003$.

For the writing samples, statistically significant differences favored the experimental group in ratings for organization. $F(1, 19) = 6.29, p < .02$, a difference of 51 standard deviations.

The authors also conducted a second study using the Cooperative Integrated Reading and Composition program. This study lasted 24 weeks and used students from a wide range of ethnic and socioeconomic background.

The subjects were 450 3rd and 4th grade students in 22 classes. Of those classes 9 were the experimental classes and 13 were the control classes.

The student population in the schools ranged from 4% to 47% disadvantaged students (i.e., those receiving free or reduced price lunch).

There was a revision made in this study and it required the teachers to be provided with more specific instruction for teaching reading comprehension skills.

As previously stated there was no difference in the pretests between the groups. The class- level analyses found significant differences favoring the experimental group on the subtests for Reading Comprehension, $F(1,20) = 12.86$, $p < .002$, Language Expression, $F(1, 20) = 4.76$, $p < .042$, and Language Mechanics, $F(1, 20) = 7.57$, $p < .012$.

The class-level analysis on the writing samples indicated a significant main effect on Ideas, $F(1, 20) = 4.28$, $p = .05$, in favor of the experimental group. The results of the ANCOVA on the oral reading measures indicate significant effects on word recognition, $F(1, 86) = 12.73$, $p < .003$, word analysis, $F(1, 86) = 10.54$, $p < .006$, and number of errors on a common paragraph, $F(1, 86) = 7.26$, $p < .017$.

What the two field experiments reported demonstrate is that if state-of--the-art principles of classroom organization, motivation, and instruction are used in the context of a cooperative learning program, student achievement in

reading and writing can be increased (Stevens, Madden, Slavin & Farnish, 1987).

Many students read and learn information from a text book. Reading instruction has lacked explicit instruction on literal comprehension skills, such as the teacher explaining how to determine the main idea of a paragraph (Durkin, 1978-79,1981). Teachers need to learn how to organize a classroom and focus on the methods of instruction in order to teach students nonliteral comprehension skills.

Research on cooperative learning has developed more effective and efficient instruction. (Slavin, 1983a, 1983b; Stevens, Madden, Slavin, & Farnish, 1987), as well as instruction that is more in tune with the developmental level and motivation of the students.

Robert J. Stevens, Robert. E. Slavin, and Anna Marie Farnish conducted an experimental study to investigate the impact of direct instruction on reading comprehension strategies and the degree to which cooperative learning processes enhance student's learning of strategies. Students were assigned to instructional treatments on strategies for identifying the main idea of passages. Treatments involved cooperative learning with direct instruction, direct instruction alone, and traditional instruction control.

Providing students with direct instruction on comprehension strategies and metacognitive skills is an effective way to teach comprehension. Many times follow up activities, or unsupervised seatwork is what students practice after each reading lesson. These activities are often of poor quality, and are not taken seriously by the students (e.g., Beck, Mckewon, McCaslin, & Burkes, 1979; Osborn, 1984) and that students' time on-task during follow-up periods is typically low.

Research on cooperative learning classroom organizations was developed instructional strategies that not only motivate students to remain on task and improve the management of follow-up activities, but also encourage and support instructionally relevant dialogue between classmates on learning tasks (Slavin, 1983a, 1987).

The Cooperative Integrated Reading and Composition program was also used in this study. This program was used so there can be more effective use of students follow up time. Students are motivated to work with one another on these activities by the use of cooperative reward structure. Students can earn certificates or other recognition that is based on the learning of all team members.

This study used 486 third and fourth grade students from an ethnically diverse school in central Pennsylvania. This study focused instruction on the comprehension of main idea passages. Direct instruction with cooperative learning, Direct instruction in reading comprehension and the control teachers who used their traditional methods and curriculum materials. All three groups used the same basal series.

In the direct instruction with cooperative learning, teachers taught comprehension strategies and metacomprehension skills that were provided in the CIRC curriculum materials. Following instruction, the students use cooperative team practice to complete the follow-up activities. When the teams were consistently answering the questions accurately, the students moved on to independent practice. The teammates checked each others' answers and provided corrective feedback.

The teachers taught the same curriculum for the direct instruction reading comprehension. The only difference is that the students worked independently to complete the follow-up activities.

In the control group, children used workbooks and worksheet activities during follow-up time after reading from the basal. Students independently complete their work.

The posttests consisted of a 20 item multiple choice test. The test was made up of 10 paragraphs, and each paragraph was followed by a main idea question and an inference question. For the posttest, the alpha coefficients for the 10 item subsets were. 80 for main ideas and 77 for inferences.

The two experimental treatments were found to produce scores on main idea questions that were significantly higher than the control groups' scores, $t(25) = 4.45$, p,.001. The direct instruction with cooperative learning produced an effect size of +.32 standard deviations above that of the direct instruction in reading comprehension.

During the cooperative practice, students evaluate, explain, and elaborate the strategies to one another. Through this process students gradually take on more responsibility as they successfully internalize and master the complex cognitive process (Steven, Slavin & Farnish,1991).

Research was done on comparing elementary school children in small-group versus whole class instruction. This research was conducted by Sharan, Ackerman and Hertz- Lazarowitz. Ten classrooms of pupils from two elementary schools participated in this study. Five classrooms, grades two through six, were in one school where teachers conduct small group teaching.

Five of the other classrooms were in the traditional whole-class. All children were from homes of low socioeconomic status.

It was hypothesized that pupils who engaged in small - group learning through investigation and discussion would display superior performance on measures of higher level cognitive functioning than would pupils in classrooms conducted with traditional presentation-recitation teaching and learning (Sharan, Ackerman & Hertz-Lazarowitz, 1992).

Each teacher taught the same topic per grade. The teacher who taught the small cooperative learning group used division of labor and their own study of available resources and discussions. Teacher in the traditional classrooms presented the topics orally, asked many questions and asked pupils to do identical homework.

Different kinds of measures were employed in this study. (1) Achievement tests (2)Standard tests of reading comprehension. The scores from the reading comprehension test were used as a covariate for adjusting the mean achievement score.

Pupils in the small group classroom expressed more ideas in their answers ($t = 3.05$, $p < .01$) and displayed greater word fluency ($t = 2.64$, $p < .02$) than their peers from the traditional classes. Also 25% of the responses

to questions by children in small group classes were illustrated with drawings while the children in the traditional classrooms drew no pictures at all.

The fundamental goals of cooperative learning in small groups are to promote processes of learning which are intellectually more complex and richer that the presentation - recitation model and to stimulate pupils to function on a higher level of affective and social involvement (Sharan, Ackerman,& Hertz- Lazarowitz, 1993).

Cooperative learning does not only benefit language art classes, even science instruction can benefit from cooperative learning. The way in which students interact with each other as they learn may have greater impact on students' achievement than do curriculum programs or teacher behaviors (Humphreys, Johnson & Johnson, 1982).

Humprehys, Johnson & Johnson researched the effects on student's achievement and attitudes of cooperative , competitive and individualistic instruction. In ninth grade physical science classes. The results indicate that cooperative learning experiences promoted greater mastery and retention of the material being taught as well as more positive attitudes toward the experience than did competitive and individualistic learning experiences.

Forty-four ninth grade junior high school students took part in the six weeks study. These students represented the middle range of academic ability and achievement.

The independent variable contain the three conditions in the study: cooperative, competitive and individualistic. In the cooperative condition students were instructed to work together as a group, making unanimous decisions, completing the assignments together, making sure that all group members contributed their suggestions and ideas seeking help and assistance from each other and not the teacher. The teacher will praise and reward the groups as a whole.

In the competitive condition, students were instructed to outperform all the other students in their class. The students were required to ask the teacher for help. The teacher praised and rewarded students who won.

In the individualistic condition students were instructed to work on their own, not asking students for assistance but only the teacher. Students' performance was compared to a preset criterion of excellence. The teacher praised and revised based on the comparison of the child's work to the preset criteria.

The two dependent variables were used, students' achievement and students' attitude toward the instructional experiences. Five achievement tests were given to all students. Two questionnaire measures of students' attitudes toward cooperative, competitive and individualistic instruction were used.

The results were as follows: the first dependent variable was achievement: on the posttests. Students in the cooperative condition score higher than the students in the competitive and individualistic condition. On the retention- test, students in the cooperative condition scored higher than did the students in the competitive and individualistic condition.

The mean scores on achievement measures were as follows: The score for the posttests for cooperative, competitive and individualistic were 69.60, 54.00 and 62.87. The scores for the retention test were 24.07, 17.29 and 20.20 respectively.

The students' attitude results toward their instructional experience were also rated. Students in the cooperative condition evaluated their condition more positively than did the student in the competitive and individualistic conditions.

Another interesting note, there were 23 absences in the cooperative condition, 34 in the competitive condition and 33 in the individualistic condition.

If interest and achievement in science are low in the ninth grade, their is little hope of increasing the number of students in high school science classes or of increasing the number of students seeking science related careers (Humphreys, et al.)

A research study was also performed to determine how student team learning methods, Student Team Division (STAD), Teams-Games Tournament (TGT), and Jigsaw, have been found to have positive effects on such student outcomes as achievement, race relations, mutual concern, and self esteem.

All of these methods involve students working in four to five members learning teams. The teams are made up of high, average and low achievers, boys and girls and students from different socioeconomic and ethnic backgrounds.

The subjects were 456 fourth and fifth grade students. Ten teachers in two schools were assigned to the experimental group and ten other teachers in four different schools were assigned to the control group. The two groups

were matched in overall average scores on the Iowa Test of Basic Skills. Control teachers had the same books and curriculum as the experimental teachers . The control teachers taught their usual way.

In the student team learning methods (STAD). The class followed a regular schedule of teacher presentation of concepts, team work on practice worksheets, and individual quizzes. The quiz scores were transformed into points and formed into team scores.

In the Teams- Games-Tournaments the students studied worksheets in their team, the only difference is they played academic games instead of taking quizzes to add points to their team scores.

In the Jigsaw II teaching method, each team had a different topic relating to the chapter on which he or she was to study. After they read their topic, the students met with other members of teams who had the same topic, after which the students took quizzes covering all topics. The quiz scores were then made into team scores also.

Students academic achievement assessed by the Comprehensive Test of Basic Skills (CTBS) Form S of the CTBS was given as a pretest, and form T as a posttest.

Students' attitudes were assessed by means of scales developed by Robert E. Slavin. This set of responses was taken from an Academic Achievement Accountability Scale written by M. Clifford. Anxiety was measured by the State - Trait- Anxiety Inventory for children.

Sociometric items were administered as pre- and posttests. Examples of questions asked were; "Who are your best friends in school?" and "If you were going to be working on a project with other children, which children would you not want to have in your group?"

Student self-esteem, was measured by the three subscales of the Coopersmith Self- Esteem Inventory. The children in the experimental group felt that they had a larger number of friends in school ($F(1, 377) = 6.24$, $p < .02$ and a smaller number of classmates with whom they would prefer not to work ($F(1, 377) = 3.97$, $p < .05$. The experimental group also gained, in general, more self- esteem ($F(1, 382) = 5.32$, $p < .03$), academic self-esteem ($F(1,382) = 3.49$, $p < .07$), and total score ($F(1,382) = 4.77$, $p < .03$.

In the Means and Standard Deviations, Affective Measure, the experimental group scored higher than the control groups. For the reading comprehension in the experimental group $X = 23.80$, $SD = 10.34$. In the control group $X = 22.68$, $SD = 9.97$. For language expression, the

experimental groups is as follows, X = 22.06, SD =7.01, In the control group X = 20.02, SD = 7.81.

It is simply possible that because students working in teams make and receive more friendships, as found in this study and others, because they are objectively more like to succeed due both to the comparison-with-equals system and to the fact of being on a learning team, and because they usually like school more, students feel more confident in their social and academic abilities and in their lives in general (Slavin & Karwett, 1981).

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Appendices

COOPERATIVE LEARNING SCORES

APPENDIX A

STUDENT ID #		TALKING WITH ARTIST	THE WHITE UMBRELLA	DAMON & PYTHIAS	AVERAGE
1		83	91	95	90
2		83	78	94	85
3		91	76	100	89
4		85	78	84	82
5		80	70	95	82
6		90	79	NA	85
7		75	69	90	78
8		81	63	83	76
9		91	94	82	89
10		82	90	86	86
11		96	90	97	94
12		74	78	85	79
13		95	92	95	94
14		86	88	97	90
15		90	60	98	83
16		96	96	88	93
17		96	78	91	88
18		94	83	82	86
19		92	86	79	86
20		91	75	89	85
21		88	65	99	84
22		88	84	87	86
23		90	90	98	93
24		90	69	91	83
25		88	85	98	90
26		96	82	98	92
27		88	93	95	92
28		95	91	100	95
29		92	84	83	86
30		100	77	96	91
31		80	71		76
32		72	51	69	64
33		89	82	98	90
34		89	69	92	83
35		92	88	89	90
36		76	71	72	73
37		59	90		75
38		84	80		82
39			84		84
40		60	80	95	78
41		81	80	80	80
42		82	60	85	76
43		92	84	100	92
44		67	61	95	74
45		81	80	84	82
46		79	51	79	70
47		91	78	86	85
48		80	71		76
49		91	78	86	85
50		82	70	93	82
51		88	71	77	79
52		84	71	67	74
53		70	75	85	77

DRTA SCORES

APPENDEX B

STUDENT ID #	SILVER & GOLD	CHAMPION	WINGS	AVERAGE
1	70	82	93	82
2	74	86	76	79
3	94	90	80	88
4	74	67	86	76
5	65	66	96	76
6	94	61	78	78
7	87	80	95	87
8	30	75	89	65
9	85	95	93	91
10	85	88	95	89
11	81	95	90	89
12	76	77	80	78
13	91	95	86	91
14	85	89	87	87
15	52	65	67	61
16	91	86	94	90
17	85	94	94	91
18	85	86	90	87
19	62	81	94	79
20	89	65	77	77
21	76	60	82	73
22	89	69	92	83
23	83	90	88	87
24	83	61		72
25	70	90	71	77
26	87	76	90	84
27	91	93	86	90
28	96	95	90	94
29	83	89	86	86
30	78	95	85	86
31	68	81	76	75
32		81	70	76
33	76	62	95	78
34	70	86		78
35	76	81	91	83
36	30	69	52	50
37	30	61	81	57
38	96	95	83	91
39	89	79	81	83
40	70	72	90	77
41	61	61	81	68
42	79	68	50	66
43	83	89	89	87
44	91	82	50	74
45	65	65	48	59
46	78	67	69	71
47	70	82	62	71
48	81	67		74
49	57	83	93	78
50	80	81	85	82
51	52	61	57	57
52	66	64	86	72
53	74	47	67	63

APPENDIX C

STUDENT ID #	PRETEST	POSTTEST
1	71	71
2	70	63
3	67	77
4	50	75
5	78	98
6	78	77
7	56	97
8	78	88
9	78	87
10	67	85
11	67	72
12	65	70
13	84	94
14	84	89
15	84	94
16	86	81
17	76	75
18	67	60
19	65	77
20	75	98
21	65	61
22	65	80
23	76	75
24	67	82
25	89	99
26	78	80
27	67	91
28	62	66
29	40	53
30	82	77
31	76	70
32	87	81
33	54	39
34	65	64
35	84	77
36	65	60
37	89	81
38	51	63
39	78	80
40	67	73
41	60	50
42	71	72
43	62	66
44	67	71
45	84	83
46	75	81
47	73	67
48	65	64
49	72	67